



# **Inensitive Munitions (IM)** **A Systems Approach**

**Mines, Demolition and Non-  
Lethal Conference**  
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# **Purpose**

- **Inform the technical community and User the benefits of using IM enhanced munitions and weapon systems**
- **The How-to approach to field IM enhanced munitions and weapons systems**



# **Background**

- **There had been on board and storage area accidents (Forrestal/Camp Doha)**
  - **Resulting in catastrophic loss of munitions, equipment, personnel as well as ships and facilities**
- **Investigations led to a common thread for these catastrophes (heat, fire and impact)**





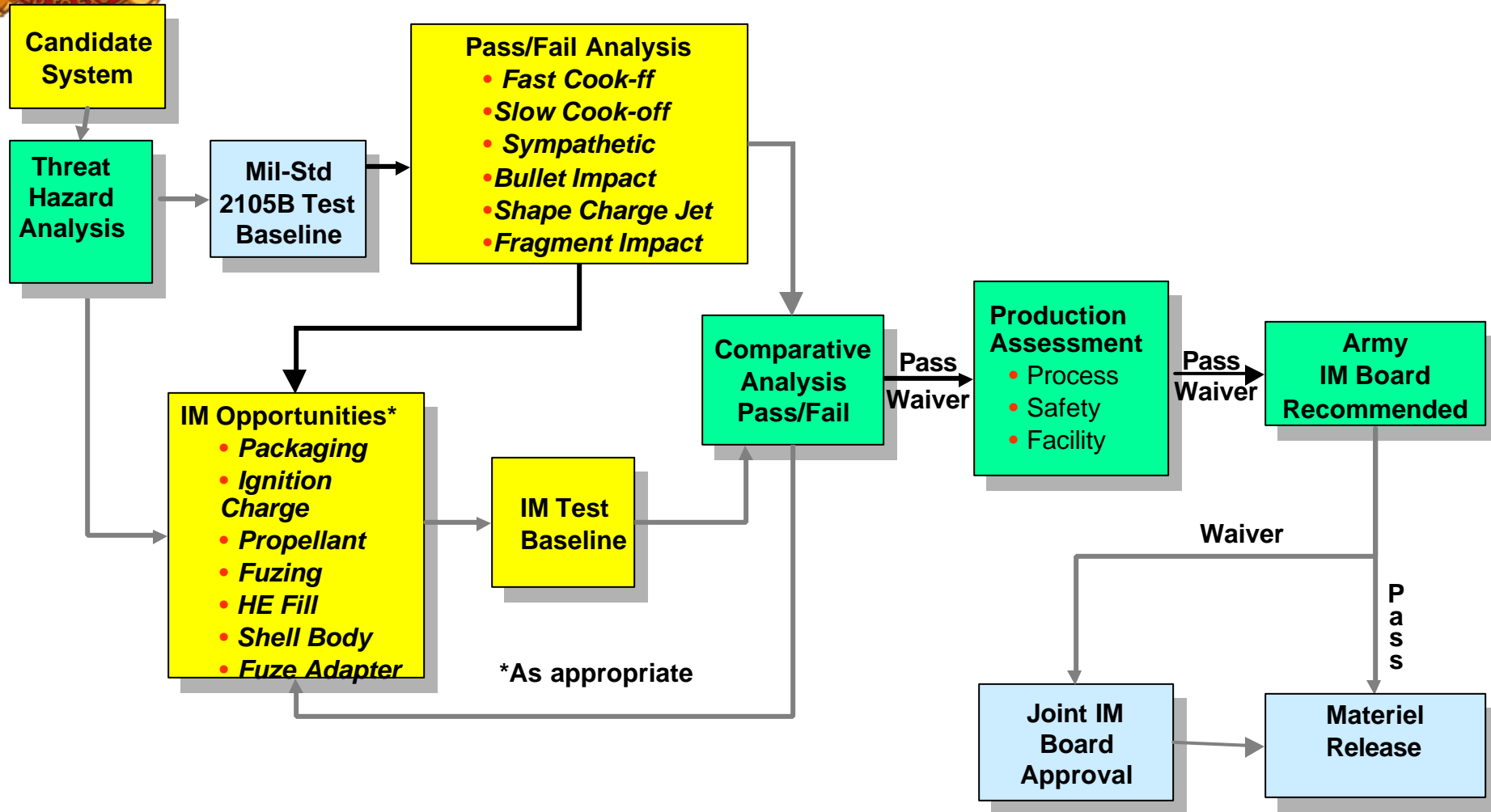
# **IM Requirements**

- Navy mandates no TNT on vessels
- DOD Directive 5000.2 -R – All munitions/weapons shall be designed to withstand unplanned stimuli (e.g. heat, blast, fragment and bullet) and use materials consistent with Safety and Interoperability
- Chairman Ganlser signed a Memorandum, subject: Exemptions for existing inventory items to IM requirements, dtd. Jan. 1999.





# Systems Approach to IM



IM solutions include more than just changing explosive

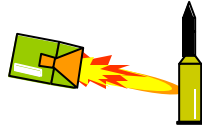




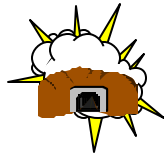
# IM Criteria

## The Threats

Shaped Charge Weapon Attack



Detonation in Magazine, Store, Aircraft or Vehicle



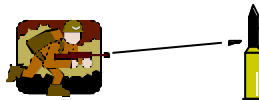
Magazine, Store, Aircraft or Vehicle Fuel Fire



Fire in Adjacent Magazine, Store, or Vehicle



Small Arms Attack



Fragmenting Munitions Attack



## The Tests MIL-STD 2105B

Shaped Charge Jet Impact\*

Sympathetic Detonation

Fast Cook-off

Slow Cook-off

Bullet Impact

Fragment Impact

## Responses

\*IM Board may assess as not required

Passing Criteria

< High Order

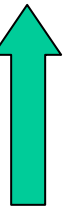
Passing Criteria

No Sympathetic Detonation

< High Order

Passing Criteria

Burn Only



More Severe

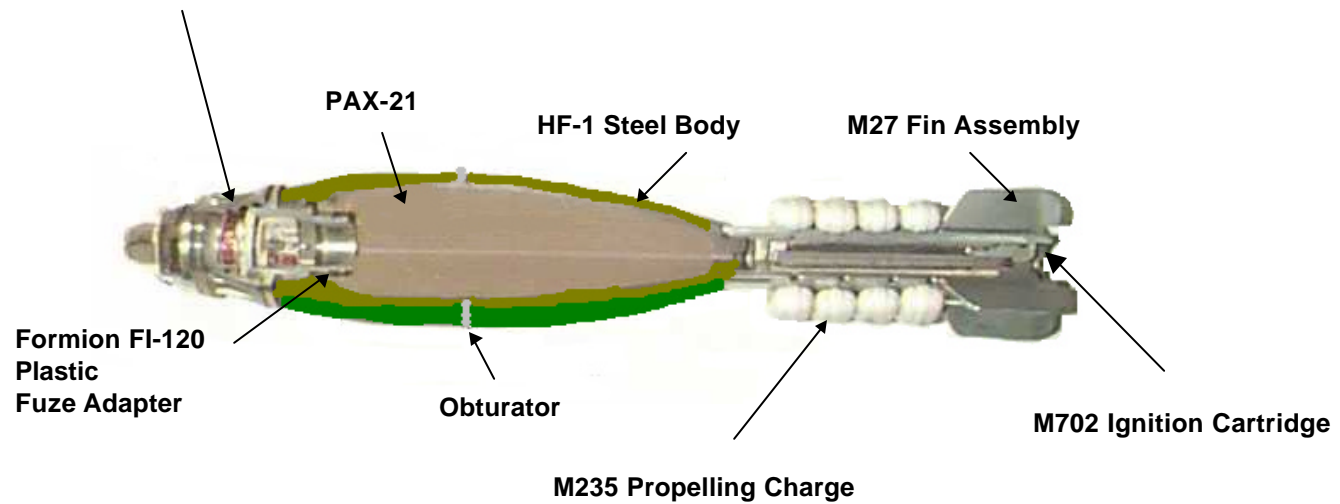
Less Severe





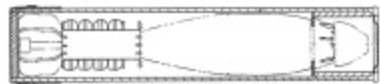
# **60mm Mortar Cartridge**

XM783 Point Detonating/Delay (PD/D) Fuze  
M734A1 Multi-option Fuze w / PBXN-5 booster

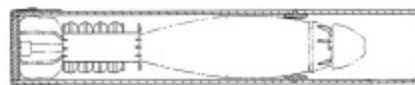
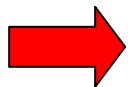




# **60 mm Packaging Design**



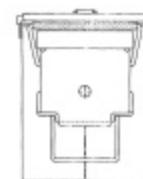
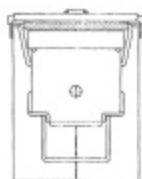
**PA78 FIBER TUBE  
W/ METAL FUZE SUPPORT CLIP**



**PA164 FIBER TUBE  
W/ PLASTIC PROJECTILE BODY SUPPORT RING**



**PA73 FIBER TUBE  
W/ PLASTIC FUZE SUPPORT CUP**



**• PA 70 AMMO CONTAINER**

- ROUND ORIENTATION = FUZE DOWN**

**• PA 124 AMMO CONTAINER  
W/ NOFIRE A18NV INTUMESCENT COATING  
(30 MILS THICKNESS)**

- ROUND ORIENTATION = FUZE UP**

## **•Packaging Changes:**

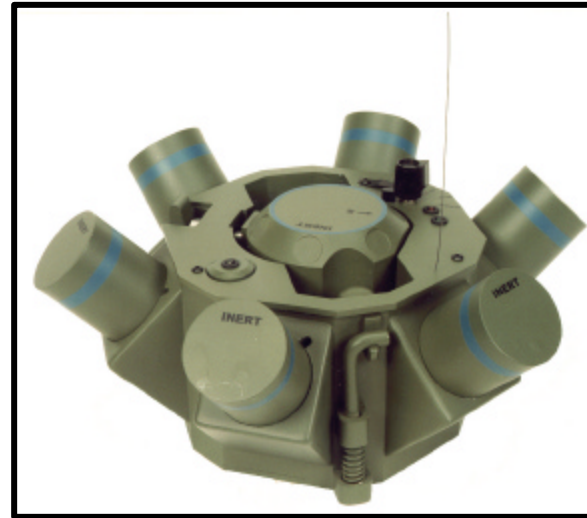
- Ammunition support clip
- Rearrange ammunition configuration
- Intumescent coating on metal can





# **Non-Self Destruct Alternative** **(NSD-A)**

## **MCU – Munition Controller Unit**

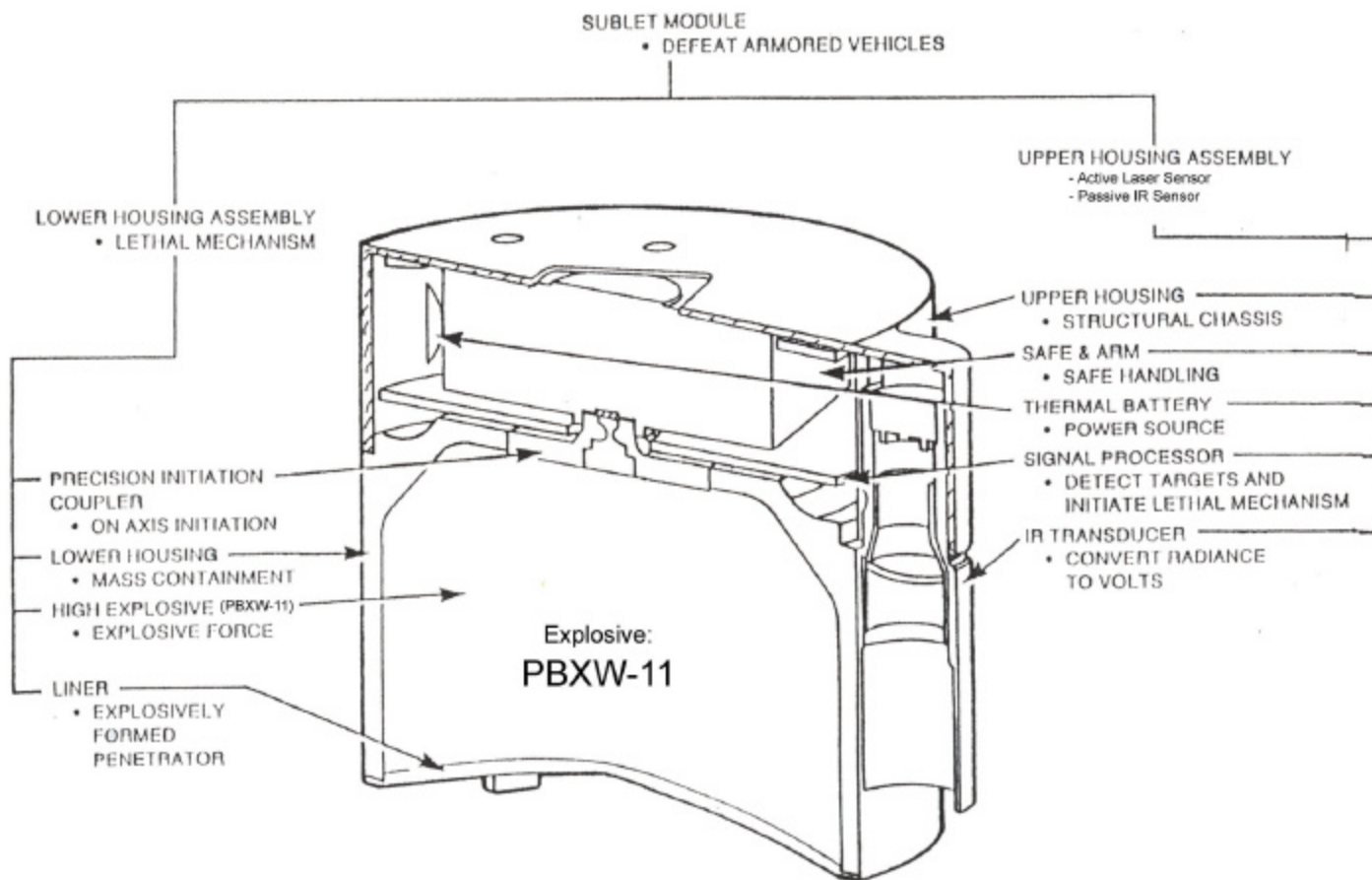


### **Kit Contains:**

- 12 MGLs (Lethal and/or non-lethal)
- Munition Adaptors (shock tube interface)
- 2 Tripline Sensor Modules



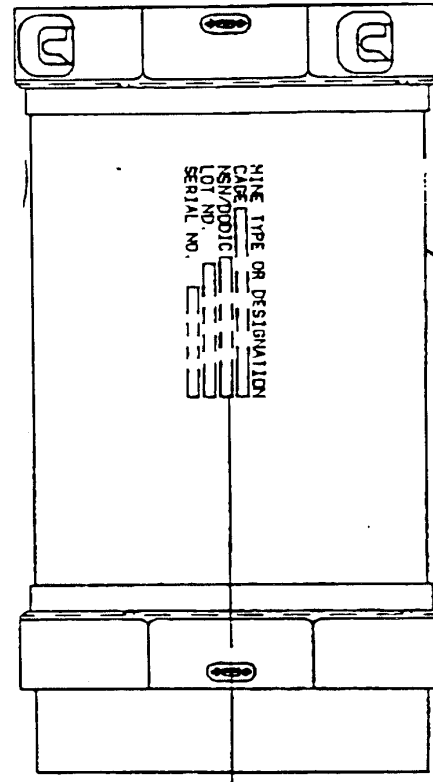
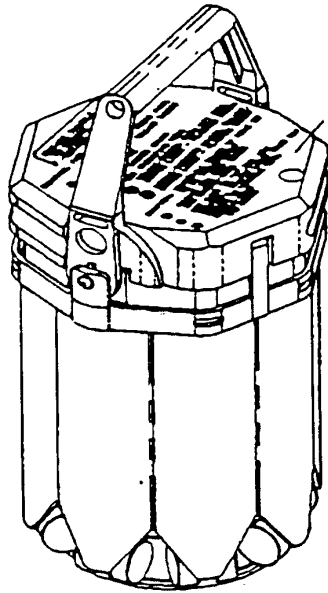
# Advanced Hornet Sublet





# **Advanced Hornet (AH) Program**

## **Sublet Packaging**



Techniques:

Configuration of items

Venting

Reinforce bottom of can to mitigate propulsion





# **Examples of Improved IM Systems**

- **APOBS**
- **MACS**
- **Javelin**
- **Hellfire**
- **120mm KE Tank Cartridge (M829A2)**
- **60mm M769 Mortar Cartridge (IM compliant)**



# **Consequences of IM** **Deficiencies**

- **Reduced system survivability**
  - Potential loss of assets, personnel, missions
  - Increased logistics burden
- **Loss of storage and transport facilities**
- **Waiver required for Materiel Release**
  - Schedule impact
  - Cost impact
- **Transportability issues (Navy mandate)**



# **Payoffs**

- **Safer for Soldier operationally as well as during transportation and storage while maintaining/increasing lethality**
- **This approach provides a foundation for other programs**
- **DOD 5000.2-R compliance**

